

## **CLAIMS**

### **WHAT IS CLAIMED:**

1. A composite structural panel comprising a planar glass panel having an inner surface and an outer surface, a honeycomb core panel having an outer honeycomb face surface and an inner honeycomb face surface, an outer prepreg including a non-metal interlay skin which has an inner skin surface and an outer skin surface, the inner skin surface of the outer non-metal interlay skin being adhesively secured to the outer honeycomb face surface of the honeycomb core panel and the outer skin surface of the outer non-metal interlay skin being adhesively secured to the inner surface of the planar glass panel by an adhesive interlayer to securely retain the glass panel to the honeycomb core panel and wherein a desired visual effect such as color and/or design is provided to the adhesive interlayer so as to be visible through the glass panel.
2. A composite panel as recited in claim 1, wherein the outer non-metal interlay skin is formed of resin impregnated fiberglass cloth.
3. A composite panel as recited in claim 2, additionally including an inner non-metal interlay skin bonded to the inner honeycomb face surface of the honeycomb core panel.
4. A composite structural panel as recited in claim 3, wherein the inner non-metal interlay skin is formed of resin impregnated fiberglass cloth.
5. A composite structural panel as recited in claim 1, wherein the visual effect is provided by printing on the adhesive interlayer.

6. A composite structural panel as recited in claim 1, wherein the visual effect is provided by an image providing sheet bearing a visible design and positioned between, and adhesively secured to, the outer skin surface of the outer non-metal interlay skin and the inner surface of the planar glass panel.
7. A composite structural panel as recited in claim 1, wherein the visual effect is provided by an image providing vinyl sheet bearing a design and positioned between, and adhesively secured to, the outer skin surface of the outer non-metal interlay skin and the inner surface of the planar glass panel.
8. A composite structural panel as recited in claim 1, wherein the outer non-metal interlay skin is formed of resin impregnated fiberglass cloth and the visual effect is provided by an image providing sheet bearing a visible design and positioned between, and adhesively secured to, the outer skin surface of the outer non-metal interlay skin and the inner surface of the planar glass panel.
9. A composite structural panel as recited in claim 1, additionally including an inner non-metal interlay skin adhesively secured to the inner honeycomb face surface, wherein the inner non-metal interlay skin is formed of resin impregnated fiberglass cloth and the desired visual effect is provided by an image providing sheet bearing a visible design and positioned between, and adhesively secured to, the outer skin surface of the outer non-metal interlay skin and the inner surface of the planar glass panel.
10. A composite structural panel as recited in claim 1, wherein the desired visual effect is provided by an image providing fabric sheet bearing a visible design and positioned between, and adhesively secured to, the outer skin surface of the outer non-metal interlay skin and the inner surface of the planar glass panel.

11. A composite structural panel as recited in claim 1, wherein the adhesive interlayer is ethylvinylacetate.
12. A composite panel as recited in claim 11, wherein the outer non-metal interlay skin is formed of resin impregnated fiberglass cloth.
13. A composite structural panel as recited in claim 11, wherein the desired visual effect is provided by printing on the adhesive interlayer.
14. A composite structural panel as recited in claim 11, wherein the desired visual effect is provided by an image providing sheet bearing a visible design and positioned between, and adhesively secured to, the outer skin surface of the outer non-metal interlay skin and the inner surface of the planar glass panel.
15. A composite structural panel as recited in claim 11, wherein the desired visual effect is provided by an image providing vinyl sheet bearing a visible design and positioned between, and adhesively secured to, the outer skin surface of the outer non-metal interlay skin and the inner surface of the planar glass panel.
16. A composite structural panel as recited in claim 1, wherein the adhesive interlayer is polyvinylbutyl.
17. A composite panel as recited in claim 16, wherein the outer non-metal interlay skin is formed of resin impregnated fiberglass cloth.
18. A composite structural panel as recited in claim 16, wherein the desired visual effect is provided by printing on the adhesive interlayer.

19. A composite structural panel as recited in claim 16, wherein the desired visual effect is provided by an image providing sheet bearing a visible design and positioned between, and adhesively secured to, the outer skin surface of the outer non-metal interlay skin and the inner surface of the glass panel by adhesive.
20. A composite structural panel as recited in claim 16, wherein the desired visual effect is provided by an image providing vinyl sheet bearing a visible design and positioned between, and adhesively secured to, the outer skin surface of the outer non-metal interlay skin and the inner surface of the planar glass panel.
21. A composite structural panel as recited in claim 1, wherein the adhesive interlayer is polycarbonate.
22. A composite structured panel as recited in claim 1, wherein the adhesive interlayer is colored so as to be visible through the glass panel.
23. A composite structure as recited in claim 1, wherein the honeycomb core is primarily formed of aluminum.
24. A composite panel as recited in claim 23, wherein the outer non-metal interlay skin is formed of resin impregnated fiberglass cloth.
25. A composite panel as recited in claim 24, additionally including an inner non-metal interlay skin adhesively secured to the inner honeycomb face surface of the honeycomb core panel.
26. A composite structural panel as recited in claim 25, wherein the inner non-metal interlay skin is formed of resin impregnated fiberglass cloth.

27. A composite structural panel as recited in claim 23, wherein the desired visual effect is provided by printing on the adhesive interlayer.
28. A composite structural panel as recited in claim 23, wherein the desired visual effect is provided by an image providing sheet bearing a visible design and positioned between, and adhesively secured to, the outer skin surface of the outer non-metal interlay skin and the inner surface of the planar glass panel by adhesive.
29. A composite structural panel as recited in claim 23, wherein the desired visual effect is provided by an image providing vinyl sheet bearing a design and positioned between, and adhesively secured to, the outer skin surface of the outer non-metal interlay skin and the inner surface of the planar glass panel.
30. A composite structural panel comprising a planar glass panel having an inner surface and an outer surface, a honeycomb core panel having an outer honeycomb face surface and an inner honeycomb face surface, an interlayer formed of stone which has an inner surface and an outer surface, the inner surface of the interlayer being adhesively secured to the outer honeycomb face surface of the honeycomb core panel and the outer surface of the interlayer being adhesively secured to the inner surface of the planar glass panel by an adhesive film layer to securely retain the glass panel to the honeycomb core panel and wherein a desired visual effect is provided by the interlayer so as to be visible through the glass panel.
31. A composite structural panel as recited in claim 30, wherein the interlayer is formed of marble.
32. A composite structural panel as recited in claim 30, wherein the interlayer is formed of granite.
33. A composite structural panel as recited in claim 30, wherein the interlayer is formed of limestone.

34. A composite structural panel comprising a planar glass panel having an inner surface and an outer surface, a honeycomb core panel having an outer honeycomb face surface and an inner honeycomb face surface, an interlayer formed of wire mesh which has an inner surface and an outer surface, the inner surface of the interlayer being adhesively secured to the outer honeycomb face surface of the honeycomb core panel and the outer surface of the interlayer being adhesively secured to the inner surface of the planar glass panel by an adhesive film layer to securely retain the glass panel to the honeycomb core panel and wherein a desired visual effect is provided by the interlayer so as to be visible through the glass panel.
35. A composite structural panel comprising a planar glass panel having an inner surface and an outer surface, a honeycomb core panel having an outer honeycomb face surface and an inner honeycomb face surface, an interlayer formed of fabric which has an inner surface and an outer surface, the inner surface of the interlayer being adhesively secured to the outer honeycomb face surface of the honeycomb core panel and the outer surface of the interlayer being adhesively secured to the inner surface of the planar glass panel by an adhesive film layer to securely retain the glass panel to the honeycomb core panel and wherein a desired visual effect is provided by the interlayer so as to be visible through the glass panel.
36. A composite structural panel comprising a planar glass panel having an inner surface and an outer surface, a honeycomb core panel having an outer honeycomb face surface and an inner honeycomb face surface, an interlayer formed of wood which has an inner surface and an outer surface, the inner surface of the interlayer being adhesively secured to the outer honeycomb face surface of the honeycomb core panel and the outer surface of the interlayer being adhesively secured to the inner surface of the planar glass panel by an adhesive film layer to securely retain the glass panel to the honeycomb core panel and wherein a desired visual effect is provided by the interlayer so as to be visible through the glass panel.

37. A composite structural panel comprising a planar glass panel having an inner surface and an outer surface, a honeycomb core panel having an outer honeycomb face surface and an inner honeycomb face surface, an interlayer formed of vinyl which has an inner surface and an outer surface, the inner surface of the interlayer being adhesively secured to the outer honeycomb face surface of the honeycomb core panel and the outer surface of the interlayer being adhesively secured to the inner surface of the planar glass panel by an adhesive film layer to securely retain the glass panel to the honeycomb core panel and wherein a desired visual effect is provided by the interlayer so as to be visible through the glass panel.
38. A composite structural panel comprising a planar glass panel having an inner surface and an outer surface, a honeycomb core panel having an outer honeycomb face surface and an inner honeycomb face surface, an interlayer formed of film which has an inner surface and an outer surface, the inner surface of the interlayer being adhesively secured to the outer honeycomb face surface of the honeycomb core panel and the outer surface of the interlayer being adhesively secured to the inner surface of the planar glass panel by an adhesive film layer to securely retain the glass panel to the honeycomb core panel and wherein a desired visual effect is provided by the interlayer so as to be visible through the glass panel.

39. A method of providing a composite structure incorporating a glass panel, the method comprising the steps as follows:
- a. providing a metal honeycomb core panel having a planar outer core face surface and a planar inner core face surface;
  - b. providing a glass panel;
  - c. providing a resin impregnated fiberglass cloth skin sheet having first and second planar surfaces;
  - d. positioning the first planar surface of the resin impregnated fiberglass cloth skin in facing contact with the planar outer core face surface of the metal honeycomb core panel;
  - e. applying force and heat to the metal honeycomb core panel and the resin impregnated fiberglass cloth skin to urge them together and cure the resin impregnated fiberglass cloth skin and bond the fiberglass cloth skin to the metal honeycomb to provide a unitary structure;
  - f. positioning a layer of film adhesive in facing contact with the fiberglass cloth skin portion of the unitary structure;
  - g. positioning a glass panel in facing contact with the layer of film adhesive; and
  - h. applying force and heat to the unitary structure and the glass panel to urge them toward each other and effect a bonding of the glass panel to the unitary structure to create a finished composite structural panel.
40. The method of claim 39, wherein the layer of film adhesive is ethylvinylacetate.
41. The method of claim 39, wherein the layer of film adhesive is polyvinylbutyl.
42. The method of claim 39, wherein the layer of film adhesive is polycarbonate.
43. The method of claim 40, wherein the ethylvinylacetate film adhesive has been previously printed so as to provide a visual effect visible through the glass panel of the finished composite structure.



44. The method of claim 39, wherein force applied to the unitary structure is effected by evacuating air from within the unitary structure so that atmospheric pressure acts on the glass panel to urge the glass panel toward the metal honeycomb core.
45. A method of providing a composite structure incorporating a glass panel, the method comprising the steps as follows:
- a. providing a metal honeycomb core panel having a planar outer core face surface and a planar inner core face surface;
  - b. providing a glass panel;
  - c. providing a resin impregnated fiberglass cloth skin sheet having first and second planar surfaces;
  - d. positioning the first planar surface of the resin impregnated fiberglass cloth skin in facing contact with the planar outer core face surface of the metal honeycomb core panel;
  - e. applying force and heat to the metal honeycomb core panel and the resin impregnated fiberglass cloth skin to urge them together and cure the resin impregnated fiberglass cloth skin and bond the fiberglass cloth skin to the metal honeycomb panel to provide a unitary structure;
  - f. positioning a layer of film adhesive in facing contact with the fiberglass cloth skin portion of the unitary structure;
  - g. positioning a sheet of previously printed image providing film providing a desired visual effect in facing contact with the layer of film adhesive and a second layer;
  - h. positioning a second layer of film adhesive in facing contact with the image providing film;
  - I. positioning a glass panel in facing contact with the image providing film; and
  - j. applying force and heat to the unitary structure and the glass panel to urge them toward each other and effect a bonding of the glass panel to the unitary structure to create a finished complete structure.